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LETTER TO THE EDITOR

Reply to S. M. Isakari and R. C. J. Somerville

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There is just one numerical error in the figures published in Watson and Lovelock (1983). It is of no consequence at all to the conclusions of the paper. Isakari and Somerville (1989) are thus incorrect to state that the paper contains "significant" errors. We also take issue with their statement that it is "crucial" that simulations of this type be "trustworthy".

Of the five figures in the original paper, the four on which the conclusions were based (Figs. 1b, c, d and Fig. 2) were computed using the Runge-Kutta 4/5 order technique, exactly the same as that used by Isakari and Somerville. There are no numerical errors in these figures, unless one counts the barely perceptible departure from the vertical in the lines marking the transition between finite solutions and zero-population solutions. (Isakari and Somerville's figures solutions also show non-vertical lines, and are still formally incorrect; the lines of course represent discontinuities in the solution. This is hair-splitting, but it is difficult to point out the errors in their trivial paper without descending to even greater triviality.)

Our Fig. 1a does indeed show a solution which is incorrect in detail. It was added at a late stage, for the sake of completeness, and we erred in not checking for full convergence. The figure is not mentioned in the text of the original paper and no conclusions are based on it. While the error was regrettable, it seems hardly worth writing a paper almost as long as the original just to point it out!

Isakari and Somerville state in their abstract that our errors do not *significantly* affect our conclusions. In fact they do not affect our conclusions *at all*, and not a word of the original paper need be changed.

They go on to say that, since the model is not testable by observation, it is "crucial" that the computations be "trustworthy". But all the conclusions from the model are qualitative, and our calculations were sufficiently accurate to illustrate them, so in what way are the computations "untrustworthy"? Complete numerical accuracy was not necessary to illustrate the scientific points we wanted to make. Furthermore, we specifically warned the reader that we used an approximation to simplify computation, which makes the results generally accurate to only about 2°C. Isakari and Somerville's abstract leaves the casual reader with the impression that we could be "miles wide" of the true solutions, which (as any reader who compares the original with their work will see) is simply not the case.

REFERENCES

Isakari, S. M. and Somerville, R. C. J. 1989. Accurate numerical solutions for Daisyworld. *Tellus 41B*, 478–482.

Watson, A. J. and Lovelock, J. E. 1983. Biological homeostasis of the global environment: the parable of Daisyworld. *Tellus 35B*, 284–289.